DCLU Director's Rule 9-2001

Applicant:	Page	Supersedes:
City of Seattle Department of Design, Construction and Land Use	1 of 3	NA
	Publication: 9/6/01	**Effective:** 9/10/02
Subject: Exceptions for Installing Fire and Smoke Dampers in Exhaust Shafts Served by a Continuously Operating Fan	**Code and Section Reference:** 1997 SBC Sections 713.10, 713.11, Chapter 9	
	Type of Rule: Code Interpretation	
	Ordinance Authority: SMC 3.06.040	
Index Seattle Building Code, Technical and Procedural Requirements	**Approved** (signature on file) Diane M. Sugimura, Acting Director	**Date** 9/9/02

PURPOSE:

The purpose of this Director's Rule is to set forth the conditions under which the exceptions to installing smoke dampers and fire dampers may be used concurrently in the same exhaust-only shaft enclosure penetration, i.e., the same subduct, for certain types of occupancies.

BACKGROUND:

Seattle Building Code Sections 713.10 and 713.11 require smoke and fire dampers, respectively, in ducted or unducted openings at penetrations of exhaust-only shaft enclosures. Smoke dampers may be omitted by an exception to Section 713.10, item 3, where there are exhaust-only openings in a vented shaft served by a continuously operating fan and protected using the provisions of SBC Chapter 9. Fire dampers may be omitted by an exception to Section 713.11, item 3, where the shaft is penetrated by a steel exhaust air subduct extending vertically upward at least 22 inches (559 mm) above the top of the opening in a vented shaft where the airflow is upward.

RULE:

SBC Section 713.11, exception number 3, which allows omission of fire dampers in an exhaust-only shaft enclosure penetration, may be used concurrently with SBC 713.10, exception number 3, which allows omission of a smoke damper, under the following conditions.

1. **Occupancy and Exhaust Type Restrictions.** This rule applies to B, M, and R occupancies, and is limited to the following types of exhaust systems: domestic kitchen exhausts including range hoods, residential or commercial bathroom exhausts, clothes dryer exhausts, laundry room general exhausts, electrical closet exhausts, janitor closet exhausts, and other general environmental air exhaust systems.

2. **Subduct Requirements.**

   a) Construction. The subduct shall be constructed of steel at least 0.019 inch (0.48 mm) thickness (No. 26 galvanized sheet steel gage), and extend at least 22 inches (559 mm) above the top of the shaft enclosure penetration. (These requirements are set forth in SBC Sections 713.10 and 713.11.) The shaft walls may not be used as one or more sides of the subduct, unless covered by sheet steel. The shaft and subducts shall be of substantially airtight construction (joints and seams continuously sealed).

   b) Airflow resistance. In general, there is no limit on the number of subducts per shaft per floor. However, airflow resistance caused by the intrusion of subducts into the shaft shall be taken into consideration and the subducts, shaft, and fan shall be arranged and sized accordingly.

   c) Airflow upward: SBC Section 713.11, exception 3 requires airflow to be upward in order to use the exception.

3. **Applicable 1997 Seattle Building Code Chapter 9 Provisions.** Seattle Building Code Section 713.10, item 3 allows omission of smoke dampers in shaft enclosure penetrations protected using the provisions of SBC Chapter 9. Following is a list and description of Chapter 9 provisions that, at a minimum, must be shown to be addressed or considered, as appropriate, by the designer. It is the designer's responsibility to determine if other provisions of Chapter 9 apply. For complete text and requirements, refer to Chapter 9 of the 1997 Seattle Building Code.

   a) Section 905.2.5. Requires that the exhaust shaft fan be capable of continued operation for not less than 20 minutes after detection of fire event. Plans shall describe how this requirement will be met. (See additional power supply requirements below at item f.)

   b) Section 905.7.2. Requires components of exhaust shaft fans to be rated and certified by the manufacturer for the probable temperature rise to which the components may be exposed. Plans shall show temperature rise computation per equation 5-13, set forth in SBC Section 905.7.2, and include a copy of manufacturer published data to show that the specified product complies.

c) Section 905.7.3. Requires duct materials and joints to be capable of withstanding the probable temperatures and pressures to which they are likely to be exposed during a fire. Plans shall show computations per equation 5-13 and require ducts be leak tested to meet the performance requirements set forth in SBC Section 905.7.3.

d) Section 905.7.4. Requires exhaust outlets be located so as to minimize the reintroduction of smoke into the building, and to limit exposure to the building and adjacent buildings. At a minimum, compliance with Seattle Mechanical Code Section 505.9, item 2 is required (exhaust outlet location limitations).

e) Section 905.7.6. Requires belt drive fans to have 1.5 times the number of belts required for design duty with the minimum number of belts being 2. Also requires motors driving fans to have a service factor of 1.15. Plans shall include calculations and specifications describing compliance with this section.

f) Section 905.8. The exhaust shaft fan required by this rule shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an approved source complying with the Seattle Electrical Code. Plans shall describe compliance with this section.

g) Section 905.13.3. Provides that only the firefighter's controls at the fire alarm panel shall control the exhaust shaft fan's operation on or off during an alarm event. Plans shall describe compliance with this section.

4. **Exhaust Shaft Fan Operation Shall be Continuous and May Be Modified by Automatic Controls.** The exhaust shaft fan's operation shall be continuous. The fan's speed or cubic feet per minute (cfm) capacity may be designed to increase in response to a fire or otherwise modified as necessary if required by the rational analysis set forth in SBC Section 905.2.2. Plans shall describe that the exhaust shaft fan will operate at full capacity for at least 20 minutes upon receipt of an automatic or manual on signal from the fire alarm panel (see item 3.a above).

5. **Rational Analysis Required.** The exhaust system allowed by this rule shall be integrated into the building smoke control system. The rational analysis required by SBC Section 905.2.2 shall be used to show that the exhaust system allowed by this rule is compatible with or integrated with the building smoke control system. Computations shall be included with the plans.

6. **Negative Pressure or Airflow Requirements upon Detection of Smoke/Fire Event.** The exhaust system allowed by this rule shall be designed in accordance with SBC Section 905.3, Pressurization Method, or SBC Section 905.4, Airflow Method. Plans shall describe how the proposed exhaust system will comply with this requirement.

7. **Design and Certification of Operation by Professional Engineer:** Plans, computations, specifications, and acceptance test outlines for systems complying with this Rule shall be prepared, designed by or under the direct supervision of, and stamped by a professional engineer licensed to practice under the laws of the State of Washington.

8. **Installation, testing, service and maintenance**: Appropriate certificates as required by Seattle Fire Code Appendix III-B shall be obtained for all install, test, service, and maintenance personnel. A complete report of testing shall be prepared as required by SBC Section 905.15.9.